

## Photosynthesis

GRADES 3–5

### Guiding Question

What is photosynthesis, and why is it important to all life on Earth?

### Connecting Concepts

- The energy released [from] food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water). (NGSS, PS3.D: Energy in Chemical Processes and Everyday Life)
- The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. (NGSS, LS2.A: Interdependent Relationships in Ecosystems [abridged])
- As part of the forest ecosystem, trees have various roles. These roles include supplying oxygen, producing food, providing habitat for wildlife, stabilizing soil, moderating temperature, capturing, and storing carbon, and cycling water and nutrients. (PLT FLF, 1.B.6)
- Forest ecosystems include processes such as photosynthesis, energy flow, and the cycling of nutrients, water, carbon, and other matter. (PLT FLF, 1.C.3)

### Scope and Sequence

The collection and arrangement of content below supports an intentional student learning progression.

Activity	Description
<b>Tree Cookies</b>	Students look at cross-sections of tree trunks or branches (“tree cookies”) to learn how trees grow.
<b>Every Tree for Itself</b>	Students engage in an active simulation to learn what resources trees need and how trees compete for resources.
<b>Tree Factory</b>	Students model the parts of a tree and imagine it as a “food factory.”
<b>Web of Life</b>	Students research plants and animals in a forest ecosystem and model how they are connected through food energy.
<b>Here We Grow Again</b> (in Grades K–2, see 3–5 Variation)	Students investigate what happens when plants are grown under various conditions, such as with and without sunlight.
<b>Plant a Tree</b> (in Grades 6–8, see 3–5 Variation)	Students plant a tree and track its growth over time.

See [plt.org/academic-standards](http://plt.org/academic-standards) for detailed standards correlations for each activity.

### Storyline

Students explore the concept that photosynthesis, the ability of plants to use the sun’s energy to make food, is the foundation of all life on Earth.

Storyline continued on next page.



## Photosynthesis (cont.)

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- Begin with the activity Tree Cookies, in which students examine cross-sections of tree trunks or branches to see how trees grow each year. Ask them where they think trees get the food and energy they need to grow, and explain that they will be exploring this question throughout the unit.
- Next, use the activity Every Tree for Itself to demonstrate that trees need sunlight, water, carbon, and nutrients to grow by modeling what happens when trees don't get one or more of those things. Introduce the term photosynthesis as appropriate for your group.
- Use the activity Tree Factory to help students understand how the different parts of a tree work together to produce food for the tree.
- Then use the activity Web of Life to model how food energy flows from trees and other plants to other organisms in a forest ecosystem.
- Follow this with the activity Here We Grow Again. Challenge students to design their own investigation to see how factors such as sunlight and water affects plant growth.
- Conclude the unit with the activity Plant a Tree. In the Variation for Grades 3–5, students choose a suitable location for a tree, plant it, and track its growth over time. Ask them to describe how the tree's ability to photosynthesize will help to support other organisms throughout its life.

